

WHAT WE CLAIM IS:

1. A steering control system for a vehicle including a steering wheel shaft transmitted with an operation angle of a steering wheel, a vehicle wheel
5 steering shaft to be steered at a vehicle wheel steering angle depending on the operation angle of the steering wheel and a vehicle driving condition, and a motor for rotating the vehicle wheel steering shaft at the vehicle wheel steering angle, the steering control system comprising:
 - a steering wheel shaft angle detecting means for detecting a steering
10 wheel shaft angle position;
 - a vehicle wheel steering shaft angle detecting means for detecting a vehicle wheel steering shaft angle position;
 - a vehicle condition detecting means for detecting the vehicle driving condition;
 - 15 a drive controlling means for determining a target angle position of the vehicle wheel steering shaft based upon the steering wheel shaft angle position and the vehicle driving condition, and for approximating the vehicle wheel steering shaft angle position to the target angle position; and
 - a current detecting means for detecting an electric current supplied to
20 the motor,
- wherein a rotational speed of the motor is adjusted by a duty ratio of a pulse width modulation control in response to an angle deviation of the vehicle wheel steering shaft angle position from the target angle position so as to follow the rotation of the vehicle wheel steering shaft to the rotation of the
25 steering wheel shaft, and
- the motor is electrically excited by a direct current power source via first and second coils included in the motor, one end of the first coil being connected to one end of the second coil, the other end of the first coil and the other end of the second coil serving as a first power supply terminal and a second power
30 supply terminal so as to electrically excite the first and second coils respectively, and
- wherein the PWM control includes a first PWM control and a second PWM control, the first PWM control is performed with the first and second power supply terminals, the first power supply terminal being kept non-switched
35 under being connected to a first pole of the direct current power source, and the second power supply terminal capable of being switched under being

- conn cted to a second pole of the direct current power source, and
the second PWM control is performed by switching a first connected
condition and a second connected condition by turns, the first connected
condition established with the first power supply terminal being connected to
5 the first pole of the direct current power source and the second power supply
terminal being connected to the second pole thereof, and the second
connected condition established with the first power supply terminal being
connected to the second pole thereof and the second power supply terminal
being connected to the first pole, and the steering control system further
10 comprising:
a PWM control selecting means included in the drive controlling
means, the PWM control selecting means for selecting the first PWM control
or the second PWM control, the first PWM control performed under a first
driving condition in which the motor is supplied with an electric current
15 being smaller than a reference value, and the second PWM control performed
under a second driving condition in which the motor is supplied with an
electric current being greater than the reference value.
2. A steering control system for a vehicle according to claim 1, further
20 comprising:
a motor operation limiting means included in the drive controlling
means, the motor operation limiting means for limiting the electric current
to be supplied to the motor based upon the electric current detected by the
current detecting means.
- 25 3. A steering control system for a vehicle according to claim 2, further
comprising:
a lock mechanism capable of switching a locked condition and an
unlocked condition, the locked condition established for connecting the
30 steering wheel shaft and the vehicle wheel steering shaft being mechanically
disconnected from the steering wheel shaft for their integral rotation so as to
directly transmit a manual operation force applied to the steering wheel
shaft to the vehicle wheel steering shaft, and the unlocked condition
established for releasing the steering wheel shaft and the vehicle wheel
35 steering shaft from the locked condition; and
a lock controlling means included in the motor operation limiting

means, the lock controlling means capable of stopping the operation of the motor during the locked condition of the lock mechanism.

4. A steering control system for a vehicle according to claim 1, wherein the
5 PWM control selecting means selects the first PWM control or the second PWM control based upon a comparison between the electric current detected by the electric current detecting means and a threshold value.

5. A steering control system for a vehicle according to claim 2, wherein the
10 PWM control selecting means selects the first PWM control or the second PWM control based upon a comparison between the electric current detected by the electric current detecting means and a threshold value.

6. A steering control system for a vehicle according to claim 3, wherein the
15 PWM control selecting means selects the first PWM control or the second PWM control based upon a comparison between the electric current detected by the electric current detecting means and a threshold value.

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